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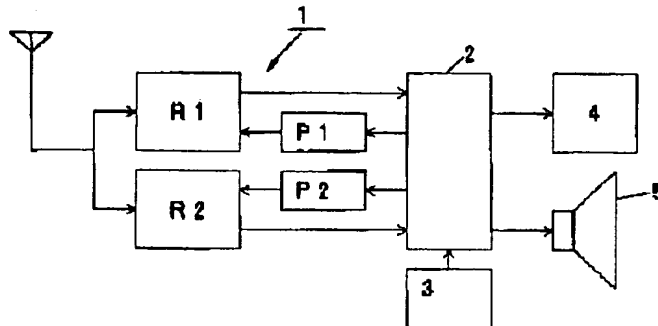
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TITLE : RECEIVER



ABSTRACT : **PROBLEM TO BE SOLVED:** To automatically search another channel with same contents, when the situation of broadcast electric wave being received has deteriorated and to automatically execute change-over to the channel by obtaining correlation between the signal from a received substitute channel and the signal from a main channel when signal strength is equal to below a prescribed level and executing change-over and an output, when the correlation of the signals are obtained.

SOLUTION: At least two receiving parts R1 and R2, constituted for receiving broadcast electric wave, are provided. when the reception intensity of the signal of the main channel, which is received and demodulated in the first receiving part R1, currently, has deteriorated, the second receiving part R2 is automatically used so as to receive the signal of another channel. That is, when another substitute channel with the same contents which are received more strongly as compared with the signal of the main channel is discovered, change-over is executed for the substitute channel. Therefore, broadcasting with same contents is continuously received with high quality, and safe driving can be mode without requiring a channel change-over operation, while driving.

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CLAIMS

[Claim(s)]

[Claim 1] With at least two receive sections constituted so that it is attached in mobiles, such as an automobile, the broadcasting electric-wave of each channel, such as television and radio, was received, and it got over, and it might be the receiving set to output and a broadcasting electric-wave might be received A detection means to detect the receiving reinforcement of the signal of the main channel received in any one receive section, a comparison means by which the detected signal strength judges whether it is below predetermined level, and when signal strength is below predetermined level, The search means which controls any other one receive section and carries out sequential reception of the signal of other substitution channels except said main channel, When correlation of a correlation means to judge whether correlation with the signal of the received substitution channel and the signal of the main channel is taken, and it is in agreement, the signal of the received substitution channel, and the signal of the main channel is able to be taken The receiving set characterized by having a change means to change and output a substitution channel to the main channel.

[Claim 2] With the receive section constituted so that it might be the receiving set to which is attached in mobiles, such as an automobile, receives the broadcasting electric-wave of each channel, such as television and radio, and it restores and a broadcasting electric-wave might be received At the time of a detection means to detect the receiving reinforcement of the signal of the received main channel, a comparison means by which the detected signal strength judges whether it is below predetermined level, and below predetermined level The reference table to which each main channel and the substitution channel it is broadcast that the same contents as the broadcasting electric-wave of the main channel are were made to correspond is referred to. The receiving set characterized by having determined the substitution channel corresponding to the main channel under reception, having had the change means which changes the receiving channel in a receive section to a substitution channel, having restored to said substitution channel as a main channel, and constituting so that it may output.

[Claim 3] The receiving set characterized by using a reference table as the reference table on which the substitution channel in which the location of a mobile is included, and which corresponded for every area was recorded while adding a location detection means to acquire the positional information of a mobile to the receiving set of claim 2.

[Claim 4] The receiving set characterized by for the substitution channel which corresponded for every area to consider a reference table as the configuration memorized by the map information-storage means with map information while having added the map indicating equipment which displays the map of the area where the location of a mobile is included in the receiving set of claim 3 with reference to a map information-storage means based on the positional information acquired by the map display information-storage means and the location detection means.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention, It is attached in mobiles, such as an automobile, It is related with the receiving set which receives a radio broadcasting and television broadcasting, Especially, It is related with the receiving set which has the automatic change function of a receiving channel.

[0002]

[Description of the Prior Art] When a radio broadcasting and TV broadcast were received on the predetermined frequency (channel) and it goes into the shade of a mountain slope and a big building in the center of Tokyo, moving by automobile etc., it may be hard coming to receive the electric wave of the channel. When such, a channel is changed by manual operation and looking for whether there is any broadcast of the same contents by other channels is performed.

[0003] The relay center for acting as intermediary by another channel for specific areas, such as shade of the building which such an electric wave cannot reach easily from the first, is prepared in many cases. Since the electric wave of directivity of a UHF band is stronger, in order to be easy to limit the area which can receive this electric wave and to make it not interfere each other generally, the broadcasting electric-wave of a VHF band is changed into the broadcasting electric-wave of a UHF band in a relay center, and it acts as intermediary towards the specific area which the electric wave of a VHF band cannot reach easily. For example, for the area which the 2nd channel of a VHF band cannot reach easily, the 35th channel of a UHF band etc. is set up as a substitution channel, and is broadcast from the same contents as the 2nd channel of a VHF band.

[0004] Thus, if it doubles with a substitution channel (the 35th channel of a UHF band) from said relay center when having received the signal of the 2nd channel of a VHF band, moving by automobile etc. in the area where the substitution channel is set up and a receive state gets worse, it will become possible to continue receiving the broadcasting electric-wave of the same contents in good quality.

[0005] However, since the information about as what channel the substitution channel is set in which area and a substitution channel is not usually known and especially mobiles, such as an automobile which passes through this area, could not know the information about such a substitution channel, the receive state was keeping got worse. Moreover, when substitution channel information was able to be known, while changing from the UHF band to the VHF band, the contents of broadcast were checked having pushed the channel modification carbon button, or having turned the channel modification dial, and operating it further by manual operation, and it was set as the substitution channel.

[0006] Moreover, in the center of Tokyo, when a setup of these substitution channels was completed, it comes out from this area and might usually need to be again reset as the channel.

[0007]

[Problem(s) to be Solved by the Invention] As mentioned above, however, the thing for which a channel is changed during operation Since it is necessary to check the contents of broadcast, pushing a channel modification carbon button, or turning a channel modification dial, and operating it further by manual operation while changing from a UHF band to a VHF band Since an operator's attention was directed towards the direction of actuation, the attentiveness to operation tended to become diffuse, it becomes impossible to have corresponded to sudden situations, such as elutriation, momentarily, and there was a problem that the danger of accident increased.

[0008] In addition, although there were a technique which changes to other channels automatically and is received, and small zoning (reference, such as JP,63-115428,A) used for mobile communications, such as a cellular phone, moving when signal strength fell while receiving the broadcasting electric-wave, there was nothing that these techniques continue a specific broadcasting electric-wave by different channel, and can receive.

[0009] Then, when the situation of the broadcasting electric-wave of the direction which has received gets worse while the broadcasting electric-wave of the same contents moved in the inside of the field transmitted by at least two channels, this invention looks for other channels of the same contents automatically, and is made for the purpose of

offering the automatic channel tailing equipment which can be automatically changed to the channel.

[0010]

[Means for Solving the Problem] Claim 1 of the receiving set concerning this invention is attached in mobiles, such as an automobile, receives the broadcasting electric-wave of each channel, such as television and radio, and gets over. With at least two receive sections constituted so that it might be the receiving set to output and a broadcasting electric-wave might be received A detection means to detect the receiving reinforcement of the signal of the main channel received in any one receive section, a comparison means by which the detected signal strength judges whether it is below predetermined level, and when signal strength is below predetermined level, The search means which controls any other one receive section and carries out sequential reception of the signal of other substitution channels except said main channel, When correlation of a correlation means to judge whether correlation with the signal of the received substitution channel and the signal of the main channel is taken, and it is in agreement, the signal of the received substitution channel, and the signal of the main channel is able to be taken A means to have a change means to change and output a substitution channel to the main channel is provided.

[0011] With the receive section constituted so that claim 2 might be a receiving set to which is attached in mobiles, such as an automobile, receives the broadcasting electric-wave of each channel, such as television and radio, and it restores and a broadcasting electric-wave might be received At the time of a detection means to detect the receiving reinforcement of the signal of the received main channel, a comparison means by which the detected signal strength judges whether it is below predetermined level, and below predetermined level The reference table to which each main channel and the substitution channel it is broadcast that the same contents as the broadcasting electric-wave of the main channel are were made to correspond is referred to. The substitution channel corresponding to the main channel under reception is determined, and it has the change means which changes the receiving channel in a receive section to a substitution channel, and it constitutes so that it may get over as a main channel and said substitution channel may be outputted.

[0012] Claim 3 uses a reference table as the reference table on which the substitution channel in which the location of a mobile is included, and which corresponded for every area was recorded while adding a location detection means to acquire the positional information of a mobile to the receiving set of claim 2.

[0013] Claim 4 considers a reference table as the configuration the substitution channel which corresponded for every area was remembered to be by the map information-storage means with map information while adding the map indicating equipment which displays the map of the area where the location of a mobile is included in the receiving set of claim 3 with reference to a map information-storage means based on the positional information acquired by the map display information-storage means and the location detection means.

[0014]

[Embodiment of the Invention] Below, the receiving set concerning this invention is explained at a detail based on the drawing in which the gestalt of the operation was shown.

[0015] In drawing 1 which showed the gestalt of operation of this invention, 1 is the television receiver carried in the automobile, it receives the signal of which channel of a VHF band and a UHF band, and it is constituted so that it may output to TV screen and a loudspeaker. R1 is the 1st receive section, R2 is the 2nd receive section, it both connects with the common antenna and the signal of the channel specified from the control section mentioned later is received, and it is constituted so that an intermediate frequency signal may be outputted.

[0016] 2 is the control section equipped with DSP (digital signal processor), and it is equipped with the control program and control data which realize the function of the flow chart shown in drawing 2 while it restores to the intermediate frequency signal outputted from two receive sections R1 and R2 and outputs one of video signals and sound signals. P1 is the 1st PLL oscillator circuit, P2 is the 2nd PLL oscillator circuit, it oscillates on the frequency specified by the channel change signal from a control section 2, respectively, and the oscillated frequency is outputted to the 1st and 2nd receive section R1 and R2, respectively.

[0017] 3 is the key input section which inputs the data to a control section 2. TV screen where 4 displays a video signal, and 5 are loudspeakers which output a sound signal.

[0018] Below, based on drawing 2, each function and its actuation other than the recovery of a control section 2 are explained. In step 1, the receiving reinforcement of the signal of the main channel received in one of the receive sections R1, for example, the 1st receive section, is detected. In step 2, when the detected signal strength is below predetermined level, search actuation of step 3 is started. If it is not below predetermined level, it will return to step 1.

[0019] In step 3, the channel change signal for changing to other channels except said main channel is outputted to the receive section of the direction which has not received the signal of the main channel, and the 2nd PLL oscillator circuit P2 connected to the 2nd receive section R2 here. In addition, the change signal of VHF/UHF is also included in the channel change signal.

[0020] In step 4 when the signal strength of the input signal from the 2nd receive section R2 is stronger than the signal strength of the input signal of the signal of the main channel It restores to the intermediate frequency signal

from the 2nd receive section R2, and the intermediate frequency signal from the 1st receive section R1, respectively. Judge that it is the broadcasting electric-wave of the same contents if correlation of two recovery signals is taken and correlation can be taken, and it shifts to step 5. When the case where the signal strength of the input signal from the 2nd receive section R2 is not stronger than the signal strength of the input signal of the signal of the main channel, and correlation are not able to be taken, it returns to step 3, and the channel change signal for changing to the following channel is outputted.

[0021] In step 5, the recovery signal of the substitution channel received in the 2nd receive section R2 is changed to a recovery signal from the 1st old receive section R1, and is outputted from TV screen and a loudspeaker. In addition, as for the 1st receive section R1, it may consider as the receive section only for VHF bands, and the 2nd receive section R2 considers as the receive section only for UHF bands, the main channel may be assigned to a VHF band and a substitution channel may assign it to a UHF band, respectively.

[0022] In addition, it is good by one after separating a sound signal and a video signal of signals to take correlation. Moreover, if the pilot signal of FM stereophonic broadcast and the subcarrier signal of color broadcast of NTSC system come to be set up so that it may change with each contents of broadcast, those signals are extracted and it is very good in correlation.

[0023] After carrying out A/D conversion first in processing of the intermediate frequency signal in the control section 2 shown in drawing 1, it processed getting over using DSP, detecting signal strength, changing the main channel, and outputting a channel change signal etc., but as shown in drawing 3, naturally an analog processing circuit may be made intermingled. Incidentally, for correlator and 25, as for a signal strength detector and 27, in drawing 3, the main channel change circuit and 26 are [23 / a demodulator circuit and 24 / a signal strength comparator circuit and 28] channel scan signal output circuits.

[0024] Moreover, the signal strength of the input signal of the 1st receive section R1 and the signal strength of the input signal of a receive section R2 are measured, As long as it is more than predetermined marginal reinforcement, the diversity method always controlled to receive the strong signal as a signal of the main channel may be applied. Moreover, like claim 2, only as one, when signal strength falls, a receive section may constitute with reference to the reference table on which the substitution channel was set up beforehand, so that the signal of the substitution channel may be received and it may change.

[0025] Drawing 4 is the block diagram showing the gestalt of operation at the time of applying the receiving set of this invention to the combination of the so-called navigation equipment which receives the electric wave from a satellite, obtains the location (lat/long) of an automobile, and displays the map of the area where the location is included with reference to the map information on CD-ROM, and car television. For a control section and P, in drawing 4, a PLL oscillator circuit and 3' of the key input section and 4 are [T / the receive section of television broadcasting, and 2' / TV screen and 5] loudspeakers.

[0026] The storage section, as for G, map information was memorized by the GPS receive section, and 7 was remembered to be by storages, such as CD-ROM, and 6 are the map display screens which display a map.

[0027] In the configuration of drawing 4, based on the current position of the mobile obtained in the GPS receive section G, control-section 2' reads the map information on a predetermined area from the storage section 7, and displays it on the map display screen 6. At this time, the substitution channel corresponding to the current position is also read to coincidence, and is changed from the storage section 7 to the substitution channel which outputted the channel change signal corresponding to it to the PLL oscillator circuit P, and read the receiving channel in a receive section T.

[0028] After signal strength falls during reception in a receive section T, you may make it change to a substitution channel at this time.

[0029] An example of the configuration of the data of the storage section 7 in the case of the gestalt of drawing 4 is explained below. Drawing 5 is drawing showing the map of a certain area, and the setting field of a substitution channel, and the map of the area which consists of an area of 25 where A of drawing 5 is divided with a broken line in every direction, and B of drawing 5 are drawings having shown with the slash the area where the substitution channel is set up among the areas shown in A of drawing 5.

[0030] As shown in A of drawing 5, the map of this area is constituted from the upper left by the map data of the area which is 25 sheets to which 1, 2, 3, ..., 25, and a number were given. The description of this area is that the big building C was built in a part for a core (area numbers 3, 8, 13, 18, and 23), and it has ranked with it, in area numbers 11, 12, 16, 17, 21, and 22, since radio disturbance has occurred, the relay center for substitution channels is installed and the substitution channel is set up. As shown in the reference table T shown in B of drawing 5 at a slash and drawing 6, the substitution channel corresponding to the usual main channel is memorized by only area numbers 11, 12, 16, 17, 21, and 22.

[0031] If it detects having entered for any of area numbers 11, 12, 16, 17, 21, and 22 being by the GPS receive section G, control-section 2', and the storage section 7 while the automobile equipped with the receiving set of this invention moves in the area of drawing 5, while the map information on the area number concerned is read, a

substitution channel will also be read from the storage section 7. Therefore, while displaying the map of the area number concerned on the map display screen 6, the channel in a receive section T is changed to a substitution channel, and the image and voice of a substitution channel are outputted to the TV screen 4 and a loudspeaker 5.

[0032] The case where it is moving in the direction of an area 22 perpendicularly along Road D in the area of drawing 5 from the direction of an area 2 is explained taking for an example the reference table T shown in drawing 6, and receiving the signal of the 6th channel of a VHF band. Since the substitution channel is not set up while passing through areas 2 and 7, the change of a channel is not performed. At this time, since these areas do not have an electromagnetic interference, the signal of the 6th channel of a VHF band is receivable good. Furthermore, if detected by the GPS receive section G, while the map display screen 6 will be changed to a display centering on an area 12, having moved and having gone into the area 12 The 39th channel of a UHF band is read from the reference table T of the storage section 7 as a substitution channel corresponding to the 6th channel of a VHF band. The channel change signal for changing to the channel is outputted to the PLL oscillator circuit P, and the receiving channel in a receive section T is changed to the 39th channel of a UHF band.

[0033] Thus, since it changes to good substitution channel flannel before the image of television is confused by changing to a substitution channel automatically, comfortable reception is continuable. When it comes out of the area where the substitution channel was set up, it is returned to the 6th channel of the original VHF band.

[0034] Although the reference table T may be referred to at this time, you may return to the original channel stored temporarily at the register etc.

[0035] Moreover, as shown in drawing 7, they are two receive sections 71 and 72. The comparator 73 which measures the receiving reinforcement in each receive section 71 and 72, and each receive section 71 and 72 The configuration equipped with the correlation section 74 which takes correlation of the signal which can be set, and the change section 75 which outputs the signal of the one where receiving reinforcement is strong when correlation is able to be taken may be used.

[0036] Since it changes to a substitution channel automatically when according to this receiving set the signal strength of the signal of the main channel falls or the area set up beforehand is entered, as explained above, receiving broadcast of the same contents can be continued in the condition that quality is higher than a condition with the main channel. Therefore, since it is not necessary to carry out channel change actuation, operating, safe operation is attained.

[0037] In addition, this invention is applicable to not only car television but a car radio, or the receiving set of various broadcasting electric-waves. And the receive section may have three or more. Moreover, a reference table is not limited to the storage means carried in the automobile, and you may make it determine a substitution channel with reference to the data supplied from the outside by media, such as an electric-wave signal, for every area under passage.

[0038] Moreover, a reference table is stored in a rewritable storage and you may enable it to update it if needed. A location may be amended, measuring not only GPS but actual mileage as a location detection means, or the technique of having amended the gap of the road on a map enough and carrying out it may be used together.

[0039]

[Effect of the Invention] When the receiving reinforcement of the signal of the main channel to which was equipped with at least two receive sections which consisted of invention of claim 1 so that a broadcasting electric-wave might be received, carried out current reception, and it has restored falls, Since it changes to a substitution channel when other substitution channels of the same contents which receive the signal of other channels using the receive section of another side, and can be automatically received strongly rather than the signal of the main channel are discovered Broadcast of the same contents is continued and the effectiveness that it is receivable in higher quality is acquired.

[0040] Therefore, it is not necessary to carry out channel change actuation, operating, and safe operation is attained.

[0041] Since a substitution channel is determined with reference to a reference table and it changes to a substitution channel, when the receiving reinforcement of the signal of the main channel to which was equipped with one receive section which consisted of invention of claim 2 so that a broadcasting electric-wave might be received, carried out current reception, and it has restored falls, even if it does not search actually receiving the signal of other channels, the effectiveness that broadcast of the same contents continues and it can receive is acquired.

[0042] In claim 3, even if it does not search actually receiving the signal of other channels by acquiring positional information, determining the substitution channel corresponding to a current location with reference to a reference table based on the current position, and changing to a substitution channel by GPS etc., the effectiveness that broadcast of the same contents is continued and it can receive is acquired.

[0043] In claim 4, since the substitution channel of the area is also read to coincidence when obtaining the current position in the navigation equipment which used GPS etc. and reading map information, even if it does not search actually receiving the signal of other channels, the signal of the substitution channel set up for every area is receivable.

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TECHNICAL FIELD

[Industrial Application] This invention, It is attached in mobiles, such as an automobile, It is related with the receiving set which receives a radio broadcasting and television broadcasting, Especially, It is related with the receiving set which has the automatic change function of a receiving channel.

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PRIOR ART

[Description of the Prior Art] When a radio broadcasting and TV broadcast were received on the predetermined frequency (channel) and it goes into the shade of a mountain slope and a big building in the center of Tokyo, moving by automobile etc., it may be hard coming to receive the electric wave of the channel. When such, a channel is changed by manual operation and looking for whether there is any broadcast of the same contents by other channels is performed.

[0003] The relay center for acting as intermediary by another channel for specific areas, such as shade of the building which such an electric wave cannot reach easily from the first, is prepared in many cases. Since the electric wave of directivity of a UHF band is stronger, in order to be easy to limit the area which can receive this electric wave and to make it not interfere each other generally, the broadcasting electric-wave of a VHF band is changed into the broadcasting electric-wave of a UHF band in a relay center, and it acts as intermediary towards the specific area which the electric wave of a VHF band cannot reach easily. For example, for the area which the 2nd channel of a VHF band cannot reach easily, the 35th channel of a UHF band etc. is set up as a substitution channel, and is broadcast from the same contents as the 2nd channel of a VHF band.

[0004] Thus, if it doubles with a substitution channel (the 35th channel of a UHF band) from said relay center when having received the signal of the 2nd channel of a VHF band, moving by automobile etc. in the area where the substitution channel is set up and a receive state gets worse, it will become possible to continue receiving the broadcasting electric-wave of the same contents in good quality.

[0005] However, since the information about as what channel the substitution channel is set in which area and a substitution channel is not usually known and especially mobiles, such as an automobile which passes through this area, could not know the information about such a substitution channel, the receive state was keeping got worse. Moreover, when substitution channel information was able to be known, while changing from the UHF band to the VHF band, the contents of broadcast were checked having pushed the channel modification carbon button, or having turned the channel modification dial, and operating it further by manual operation, and it was set as the substitution channel.

[0006] Moreover, in the center of Tokyo, when a setup of these substitution channels was completed, it comes out from this area and might usually need to be again reset as the channel.

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EFFECT OF THE INVENTION

[Effect of the Invention] When the receiving reinforcement of the signal of the main channel to which was equipped with at least two receive sections which consisted of invention of claim 1 so that a broadcasting electric-wave might be received, carried out current reception, and it has restored falls, Since it changes to a substitution channel when other substitution channels of the same contents which receive the signal of other channels using the receive section of another side, and can be automatically received strongly rather than the signal of the main channel are discovered Broadcast of the same contents is continued and the effectiveness that it is receivable in higher quality is acquired. [0040] Therefore, it is not necessary to carry out channel change actuation, operating, and safe operation is attained. [0041] Since a substitution channel is determined with reference to a reference table and it changes to a substitution channel, when the receiving reinforcement of the signal of the main channel to which was equipped with one receive section which consisted of invention of claim 2 so that a broadcasting electric-wave might be received, carried out current reception, and it has restored falls, even if it does not search actually receiving the signal of other channels, the effectiveness that broadcast of the same contents continues and it can receive is acquired. [0042] In claim 3, even if it does not search actually receiving the signal of other channels by acquiring positional information, determining the substitution channel corresponding to a current location with reference to a reference table based on the current position, and changing to a substitution channel by GPS etc., the effectiveness that broadcast of the same contents is continued and it can receive is acquired. [0043] In claim 4, since the substitution channel of the area is also read to coincidence when obtaining the current position in the navigation equipment which used GPS etc. and reading map information, even if it does not search actually receiving the signal of other channels, the signal of the substitution channel set up for every area is receivable.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] As mentioned above, however, the thing for which a channel is changed during operation Since it is necessary to check the contents of broadcast, pushing a channel modification carbon button, or turning a channel modification dial, and operating it further by manual operation while changing from a UHF band to a VHF band Since an operator's attention was directed towards the direction of actuation, the attentiveness to operation tended to become diffuse, it becomes impossible to have corresponded to sudden situations, such as elutriation, momentarily, and there was a problem that the danger of accident increased.

[0008] In addition, although there were a technique which changes to other channels automatically and is received, and small zoning (reference, such as JP,63-115428,A) used for mobile communications, such as a cellular phone, moving when signal strength fell while receiving the broadcasting electric-wave, there was nothing that these techniques continue a specific broadcasting electric-wave by different channel, and can receive.

[0009] Then, when the situation of the broadcasting electric-wave of the direction which has received gets worse while the broadcasting electric-wave of the same contents moved in the inside of the field transmitted by at least two channels, this invention looks for other channels of the same contents automatically, and is made for the purpose of offering the automatic channel tailing equipment which can be automatically changed to the channel.

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MEANS

[Means for Solving the Problem] Claim 1 of the receiving set concerning this invention is attached in mobiles, such as an automobile, receives the broadcasting electric-wave of each channel, such as television and radio, and gets over. With at least two receive sections constituted so that it might be the receiving set to output and a broadcasting electric-wave might be received A detection means to detect the receiving reinforcement of the signal of the main channel received in any one receive section, a comparison means by which the detected signal strength judges whether it is below predetermined level, and when signal strength is below predetermined level, The search means which controls any other one receive section and carries out sequential reception of the signal of other substitution channels except said main channel, When correlation of a correlation means to judge whether correlation with the signal of the received substitution channel and the signal of the main channel is taken, and it is in agreement, the signal of the received substitution channel, and the signal of the main channel is able to be taken A means to have a change means to change and output a substitution channel to the main channel is provided.

[0011] With the receive section constituted so that claim 2 might be a receiving set to which is attached in mobiles, such as an automobile, receives the broadcasting electric-wave of each channel, such as television and radio, and it restores and a broadcasting electric-wave might be received At the time of a detection means to detect the receiving reinforcement of the signal of the received main channel, a comparison means by which the detected signal strength judges whether it is below predetermined level, and below predetermined level The reference table to which each main channel and the substitution channel it is broadcast that the same contents as the broadcasting electric-wave of the main channel are were made to correspond is referred to. The substitution channel corresponding to the main channel under reception is determined, and it has the change means which changes the receiving channel in a receive section to a substitution channel, and it constitutes so that it may get over as a main channel and said substitution channel may be outputted.

[0012] Claim 3 uses a reference table as the reference table on which the substitution channel in which the location of a mobile is included, and which corresponded for every area was recorded while adding a location detection means to acquire the positional information of a mobile to the receiving set of claim 2.

[0013] Claim 4 considers a reference table as the configuration the substitution channel which corresponded for every area was remembered to be by the map information-storage means with map information while adding the map indicating equipment which displays the map of the area where the location of a mobile is included in the receiving set of claim 3 with reference to a map information-storage means based on the positional information acquired by the map display information-storage means and the location detection means.

[0014]

[Embodiment of the Invention] Below, the receiving set concerning this invention is explained at a detail based on the drawing in which the gestalt of the operation was shown.

[0015] In drawing 1 which showed the gestalt of operation of this invention, 1 is the television receiver carried in the automobile, it receives the signal of which channel of a VHF band and a UHF band, and it is constituted so that it may output to TV screen and a loudspeaker. R1 is the 1st receive section, R2 is the 2nd receive section, it both connects with the common antenna and the signal of the channel specified from the control section mentioned later is received, and it is constituted so that an intermediate frequency signal may be outputted.

[0016] 2 is the control section equipped with DSP (digital signal processor), and it is equipped with the control program and control data which realize the function of the flow chart shown in drawing 2 while it restores to the intermediate frequency signal outputted from two receive sections R1 and R2 and outputs one of video signals and sound signals. P1 is the 1st PLL oscillator circuit, P2 is the 2nd PLL oscillator circuit, it oscillates on the frequency specified by the channel change signal from a control section 2, respectively, and the oscillated frequency is outputted to the 1st and 2nd receive section R1 and R2, respectively.

[0017] 3 is the key input section which inputs the data to a control section 2. TV screen where 4 displays a video signal, and 5 are loudspeakers which output a sound signal.

[0018] Below, based on drawing 2, each function and its actuation other than the recovery of a control section 2 are

explained. In step 1, the receiving reinforcement of the signal of the main channel received in one of the receive sections R1, for example, the 1st receive section, is detected. In step 2, when the detected signal strength is below predetermined level, search actuation of step 3 is started. If it is not below predetermined level, it will return to step 1.

[0019] In step 3, the channel change signal for changing to other channels except said main channel is outputted to the receive section of the direction which has not received the signal of the main channel, and the 2nd PLL oscillator circuit P2 connected to the 2nd receive section R2 here. In addition, the change signal of VHF/UHF is also included in the channel change signal.

[0020] In step 4 when the signal strength of the input signal from the 2nd receive section R2 is stronger than the signal strength of the input signal of the signal of the main channel It restores to the intermediate frequency signal from the 2nd receive section R2, and the intermediate frequency signal from the 1st receive section R1, respectively. Judge that it is the broadcasting electric-wave of the same contents if correlation of two recovery signals is taken and correlation can be taken, and it shifts to step 5. When the case where the signal strength of the input signal from the 2nd receive section R2 is not stronger than the signal strength of the input signal of the signal of the main channel, and correlation are not able to be taken, it returns to step 3, and the channel change signal for changing to the following channel is outputted.

[0021] In step 5, the recovery signal of the substitution channel received in the 2nd receive section R2 is changed to a recovery signal from the 1st old receive section R1, and is outputted from TV screen and a loudspeaker. In addition, as for the 1st receive section R1, it may consider as the receive section only for VHF bands, and the 2nd receive section R2 considers as the receive section only for UHF bands, the main channel may be assigned to a VHF band and a substitution channel may assign it to a UHF band, respectively.

[0022] In addition, it is good by one after separating a sound signal and a video signal of signals to take correlation. Moreover, if the pilot signal of FM stereophonic broadcast and the subcarrier signal of color broadcast of NTSC system come to be set up so that it may change with each contents of broadcast, those signals are extracted and it is very good in correlation.

[0023] After carrying out A/D conversion first in processing of the intermediate frequency signal in the control section 2 shown in drawing 1, it processed getting over using DSP, detecting signal strength, changing the main channel, and outputting a channel change signal etc., but as shown in drawing 3, naturally an analog processing circuit may be made intermingled. Incidentally, for correlator and 25, as for a signal strength detector and 27, in drawing 3, the main channel change circuit and 26 are [23 / a demodulator circuit and 24 / a signal strength comparator circuit and 28] channel scan signal output circuits.

[0024] Moreover, the signal strength of the input signal of the 1st receive section R1 and the signal strength of the input signal of a receive section R2 are measured, As long as it is more than predetermined marginal reinforcement, the diversity method always controlled to receive the strong signal as a signal of the main channel may be applied. Moreover, like claim 2, only as one, when signal strength falls, a receive section may constitute with reference to the reference table on which the substitution channel was set up beforehand, so that the signal of the substitution channel may be received and it may change.

[0025] Drawing 4 is the block diagram showing the gestalt of operation at the time of applying the receiving set of this invention to the combination of the so-called navigation equipment which receives the electric wave from a satellite, obtains the location (lat/long) of an automobile, and displays the map of the area where the location is included with reference to the map information on CD-ROM, and car television. For a control section and P, in drawing 4, a PLL oscillator circuit and 3' of the key input section and 4 are [T / the receive section of television broadcasting, and 2' / TV screen and 5] loudspeakers.

[0026] The storage section, as for G, map information was memorized by the GPS receive section, and 7 was remembered to be by storages, such as CD-ROM, and 6 are the map display screens which display a map.

[0027] In the configuration of drawing 4, based on the current position of the mobile obtained in the GPS receive section G, control-section 2' reads the map information on a predetermined area from the storage section 7, and displays it on the map display screen 6. At this time, the substitution channel corresponding to the current position is also read to coincidence, and is changed from the storage section 7 to the substitution channel which outputted the channel change signal corresponding to it to the PLL oscillator circuit P, and read the receiving channel in a receive section T.

[0028] After signal strength falls during reception in a receive section T, you may make it change to a substitution channel at this time.

[0029] An example of the configuration of the data of the storage section 7 in the case of the gestalt of drawing 4 is explained below. Drawing 5 is drawing showing the map of a certain area, and the setting field of a substitution channel, and the map of the area which consists of an area of 25 where A of drawing 5 is divided with a broken line in every direction, and B of drawing 5 are drawings having shown with the slash the area where the substitution channel is set up among the areas shown in A of drawing 5.

[0030] As shown in A of drawing 5, the map of this area is constituted from the upper left by the map data of the area which is 25 sheets to which 1, 2, 3, ..., 25, and a number were given. The description of this area is that the big building C was built in a part for a core (area numbers 3, 8, 13, 18, and 23), and it has ranked with it, in area numbers 11, 12, 16, 17, 21, and 22, since radio disturbance has occurred, the relay center for substitution channels is installed and the substitution channel is set up. As shown in the reference table T shown in B of drawing 5 at a slash and drawing 6, the substitution channel corresponding to the usual main channel is memorized by only area numbers 11, 12, 16, 17, 21, and 22.

[0031] If it detects having entered for any of area numbers 11, 12, 16, 17, 21, and 22 being by the GPS receive section G, control-section 2', and the storage section 7 while the automobile equipped with the receiving set of this invention moves in the area of drawing 5, while the map information on the area number concerned is read, a substitution channel will also be read from the storage section 7. Therefore, while displaying the map of the area number concerned on the map display screen 6, the channel in a receive section T is changed to a substitution channel, and the image and voice of a substitution channel are outputted to the TV screen 4 and a loudspeaker 5.

[0032] The case where it is moving in the direction of an area 22 perpendicularly along Road D in the area of drawing 5 from the direction of an area 2 is explained taking for an example the reference table T shown in drawing 6, and receiving the signal of the 6th channel of a VHF band. Since the substitution channel is not set up while passing through areas 2 and 7, the change of a channel is not performed. At this time, since these areas do not have an electromagnetic interference, the signal of the 6th channel of a VHF band is receivable good. Furthermore, if detected by the GPS receive section G, while the map display screen 6 will be changed to a display centering on an area 12, having moved and having gone into the area 12 The 39th channel of a UHF band is read from the reference table T of the storage section 7 as a substitution channel corresponding to the 6th channel of a VHF band. The channel change signal for changing to the channel is outputted to the PLL oscillator circuit P, and the receiving channel in a receive section T is changed to the 39th channel of a UHF band.

[0033] Thus, since it changes to good substitution channel flannel before the image of television is confused by changing to a substitution channel automatically, comfortable reception is continuable. When it comes out of the area where the substitution channel was set up, it is returned to the 6th channel of the original VHF band.

[0034] Although the reference table T may be referred to at this time, you may return to the original channel stored temporarily at the register etc.

[0035] Moreover, as shown in drawing 7, they are two receive sections 71 and 72. The comparator 73 which measures the receiving reinforcement in each receive section 71 and 72, and each receive section 71 and 72 The configuration equipped with the correlation section 74 which takes correlation of the signal which can be set, and the change section 75 which outputs the signal of the one where receiving reinforcement is strong when correlation is able to be taken may be used.

[0036] Since it changes to a substitution channel automatically when according to this receiving set the signal strength of the signal of the main channel falls or the area set up beforehand is entered, as explained above, receiving broadcast of the same contents can be continued in the condition that quality is higher than a condition with the main channel. Therefore, since it is not necessary to carry out channel change actuation, operating, safe operation is attained.

[0037] In addition, this invention is applicable to not only car television but a car radio, or the receiving set of various broadcasting electric-waves. And the receive section may have three or more. Moreover, a reference table is not limited to the storage means carried in the automobile, and you may make it determine a substitution channel with reference to the data supplied from the outside by media, such as an electric-wave signal, for every area under passage.

[0038] Moreover, a reference table is stored in a rewritable storage and you may enable it to update it if needed. A location may be amended, measuring not only GPS but actual mileage as a location detection means, or the technique of having amended the gap of the road on a map enough and carrying out it may be used together.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram having shown the configuration of the gestalt of operation of the receiving set of claim 1 of this invention.

[Drawing 2] It is the important section of the control flow chart of the control section of said receiving set.

[Drawing 3] It is the block diagram having shown the gestalt of another operation of the control section of the receiving set of claim 1.

[Drawing 4] It is the block diagram having shown claim 3 of this invention, and the gestalt of operation of four.

[Drawing 5] It is the example of drawing showing the field where the substitution channel of the map and area of a certain area was set up.

[Drawing 6] An example of the reference table in claims 3 and 4 of this invention was shown.

[Drawing 7] It is the block diagram of the gestalt of another operation.

[Description of Notations]

1 Television Receiver

R1 The 1st receive section

R2 The 2nd receive section

2 Control Section (Detection Means, Comparison Means, Search Means, Correlation Means, Change Means)

P1 1st PLL oscillator circuit

P2 2nd PLL oscillator circuit

T Receive section

2' Control section (a detection means, a comparison means, change means)

P PLL oscillator circuit

G GPS receive section (location detection means)

7 Storage Section (Map Display Information Storage Means)

6 Map Display Screen

2'6 (map display)

23 Demodulator Circuit

24 Correlator (Correlation Means)

25 The Main Channel Change Circuit (Change Means)

26 Signal Strength Detector (Detection Means)

27 Signal Strength Comparator Circuit (Comparison Means)

28 Channel Scan Signal Output Circuit (Search Means)

[Translation done.]

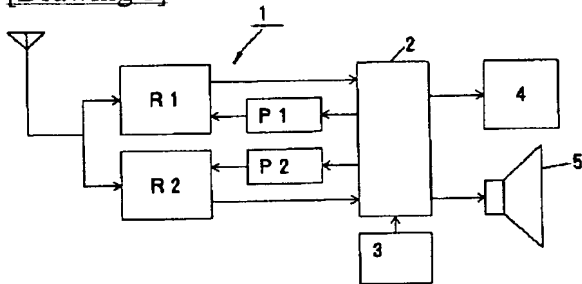
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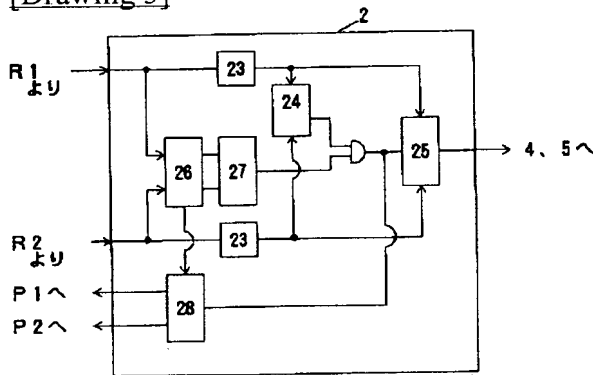
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DRAWINGS

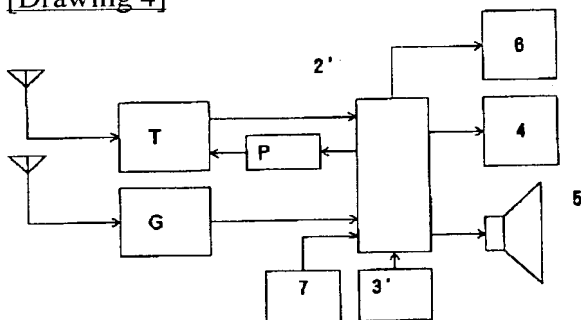
[Drawing 1]



[Drawing 3]

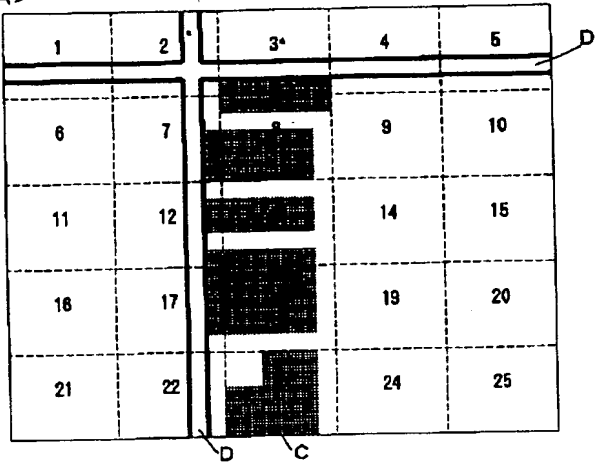


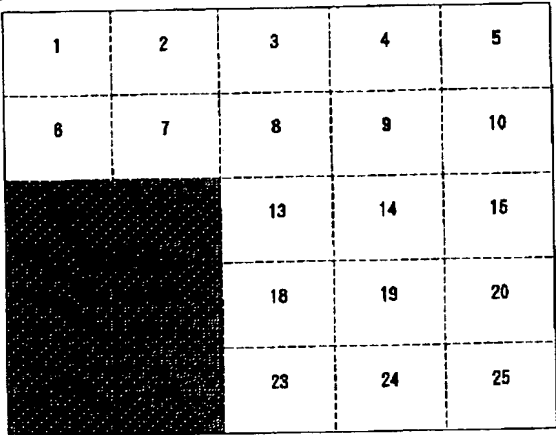
[Drawing 4]



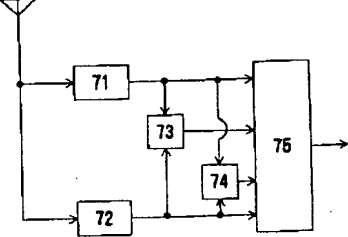
[Drawing 5]

<A>

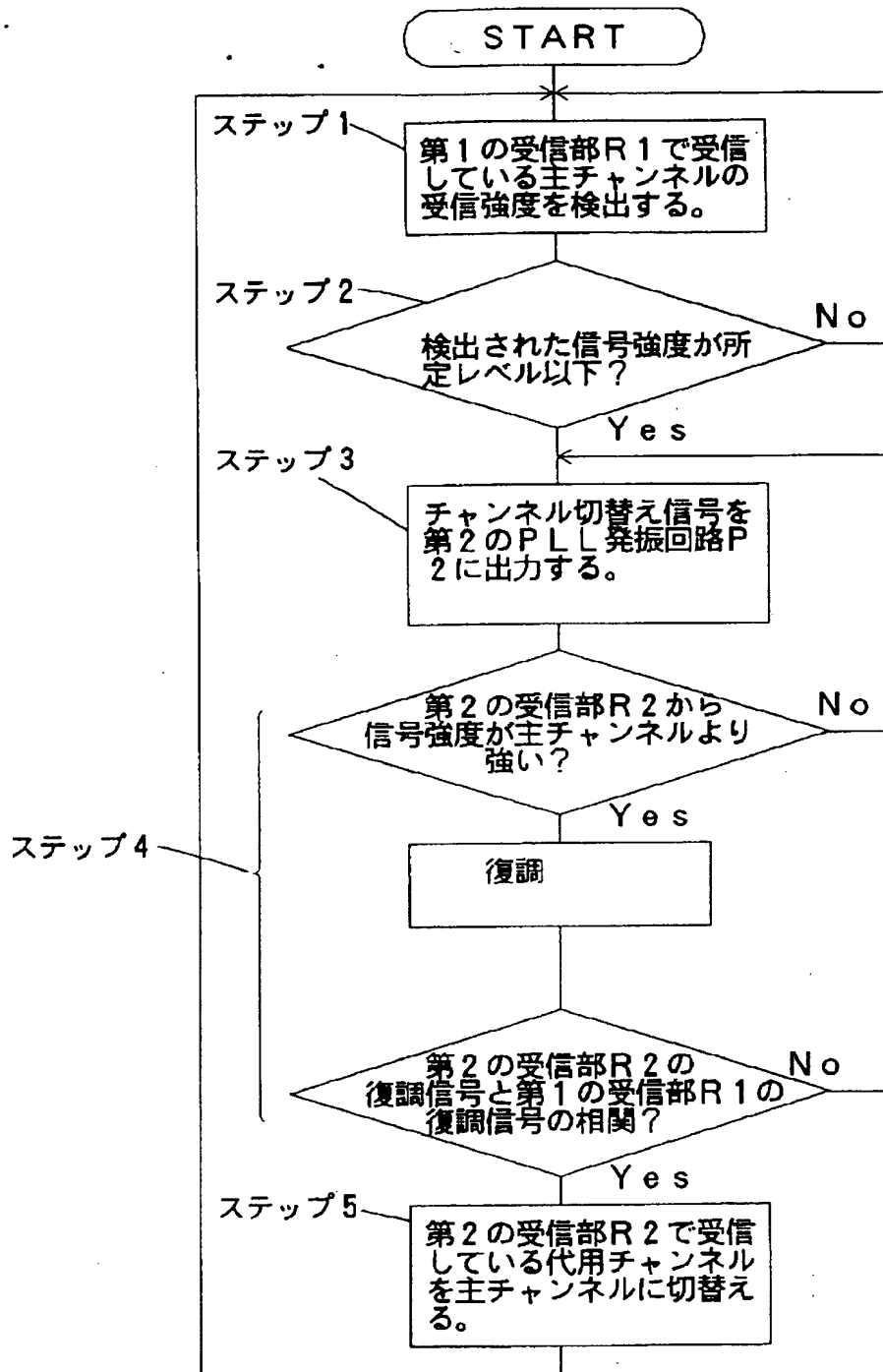




[Drawing 7]



[Drawing 2]



[Drawing 6]

参照テーブルT

区域番号	主チャンネル	代用チャンネル
1	2	設定なし
	4	設定なし
	6	設定なし
	8	設定なし
	10	設定なし
	12	設定なし
2 1	2	3 5
	4	3 7
	6	3 9
	8	4 1
	10	4 3
	12	4 5
2 2	2	3 5
	4	3 7
	6	3 9
	8	4 1
	10	4 3
	12	4 5
2 5	2	設定なし
	4	設定なし
	6	設定なし
	8	設定なし
	10	設定なし
	12	設定なし

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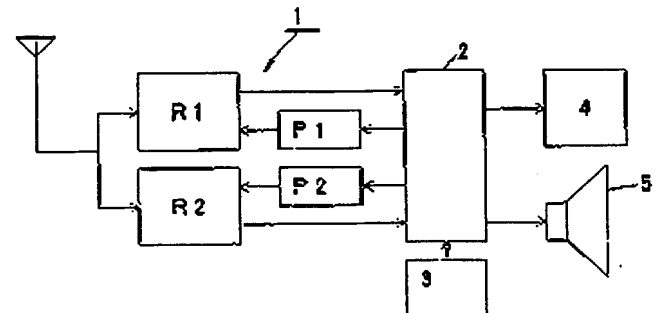
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(54) 【発明の名称】 受信装置

(57) 【要約】

【課題】 同一の内容の放送電波が少なくとも二つのチャンネルで送信されている領域内を移動中に、受信している方の放送電波の状況が悪化した場合に、自動的に同一内容の他のチャンネルを捜して、そのチャンネルに自動的に切替えることのできる装置を提供すること。

【解決手段】 放送電波を受信するよう構成された少なくとも二つの受信部 R 1, R 2 を備え、第1の受信部 R 1 で現在受信して復調している主チャンネルの信号の受信強度が低下したとき、自動的に、他方の受信部 R 2 を用いて他の同一内容の代用チャンネルに切替える。



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【特許請求の範囲】

【請求項1】自動車等の移動体に取り付けられてテレビやラジオ等の各チャンネルの放送電波を受信して復調し、出力する受信装置であって、放送電波を受信するよう構成された少なくとも2つの受信部と、何れか1つの受信部で受信している主チャンネルの信号の受信強度を検出する検出手段と、検出された信号強度が所定レベル以下か否かを判断する比較手段と、信号強度が所定レベル以下のとき、他の何れか1つの受信部を制御して、前記主チャンネルを除いた他の代用チャンネルの信号を順次受信するサーチ手段と、受信した代用チャンネルの信号と主チャンネルの信号との相関をとって一致するか否かを判断する相関手段と、受信した代用チャンネルの信号と主チャンネルの信号の相関がとれたときに、代用チャンネルを主チャンネルに切替えて出力する切替え手段とを備えたことを特徴とする受信装置。

【請求項2】自動車等の移動体に取り付けられてテレビやラジオ等の各チャンネルの放送電波を受信して復調する受信装置であって、放送電波を受信するよう構成された受信部と、受信している主チャンネルの信号の受信強度を検出する検出手段と、検出された信号強度が所定レベル以下か否かを判断する比較手段と、所定レベル以下のときに、各主チャンネルと、その主チャンネルの放送電波と同じ内容が放送されている代用チャンネルとを対応させた参照テーブルを参照して、受信中の主チャンネルに対応した代用チャンネルを決定して、受信部における受信チャンネルを代用チャンネルに切替える切替え手段とを備え、前記代用チャンネルを主チャンネルとして復調し、出力するよう構成したことを特徴とする受信装置。

【請求項3】請求項2の受信装置に、移動体の位置情報を得る位置検出手段を付加するとともに、参照テーブルを、移動体の位置が含まれる区域毎に対応した代用チャンネルが記録された参照テーブルとしたことを特徴とする受信装置。

【請求項4】請求項3の受信装置に、地図表示情報記憶手段と、位置検出手段によって得られた位置情報に基づいて地図情報記憶手段を参照して、移動体の位置が含まれる区域の地図を表示する地図表示装置とを付加するとともに、参照テーブルを、区域毎に対応した代用チャンネルが地図情報とともに地図情報記憶手段に記憶された構成としたことを特徴とする受信装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、自動車等の移動体に取り付けられ、ラジオ放送やテレビ放送を受信する受信装

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(チャンネル)でラジオ放送やTV放送を受信していると、山間部や、都心の大きなビルの際に入った場合等に、そのチャンネルの電波が受信しにくくなってしまう場合がある。このようなときには、手操作でチャンネルを変更し、他のチャンネルで同じ内容の放送がないか否かを捜すことが行われている。

【0003】もともと、そのような電波の届きにくいビルの隙等の特定の地域のために、別のチャンネルで中継するための中継局が設けられていることが多い。一般的に、UHF帯の電波のほうが指向性が強いので、この電波を受信できる地域を限定しやすく、また、互いに干渉し合わないようにするために、中継局でVHF帯の放送電波をUHF帯の放送電波に変換して、VHF帯の電波が届きにくい特定の地域に向けて中継されている。例えば、VHF帯の第2チャンネルが届きにくい地域のために、UHF帯の第35チャンネル等が代用チャンネルとして設定され、VHF帯の第2チャンネルと同じ内容で放送されている。

【0004】このように代用チャンネルが設定されている地域を自動車等で移動しながらVHF帯の第2チャンネルの信号を受信しているとき受信状態が悪化した場合には、前記中継局からの代用チャンネル(UHF帯の第35チャンネル)に合わせれば、同じ内容の放送電波を良好な品質で受信し続けることが可能になるのである。

【0005】しかしながら、通常はどの地域に、何チャンネルに代用チャンネルが設定されているか等の代用チャンネルに関する情報は、知られておらず、特に、この地域を通過する自動車等の移動体はこのような代用チャンネルに関する情報は知りえないので、受信状態が悪化したままにされていた。また、代用チャンネル情報を知りえた場合には、UHF帯からVHF帯に切替えるとともに、手操作でチャンネル変更ボタンを押したり、チャンネル変更ダイヤルを回したりし、さらに、操作しながら放送内容を確認して、代用チャンネルに設定していた。

【0006】また、都心等では、これらの代用チャンネルの設定が完了する頃には、この地域から出てしまい再度通常チャンネルに設定し直す必要が生じることもあった。

【0007】

【発明が解決しようとする課題】ところが、上述したように、運転中にチャンネルを変更することは、UHF帯からVHF帯に切替えるとともに、手操作でチャンネル変更ボタンを押したり、チャンネル変更ダイヤルを回したりし、さらに、操作しながら放送内容を確認することが必要となるので、運転者の注意が、操作の方に注がれ

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信号強度が低下したときに、自動的に他のチャンネルに切替えて受信する技術や、携帯電話等の移動体通信に用いられる小ゾーン方式（特開昭63-115428号公報等参照）があるが、これらの技術は特定の放送電波を異なるチャンネルで継続して受信できるものはなかった。

【0009】そこで、本発明は、同一の内容の放送電波が、少なくとも二つのチャンネルで送信されている領域内を移動中に、受信している方の放送電波の状況が悪化した場合に、自動的に同一内容の他のチャンネルを捜して、そのチャンネルに自動的に切替えることのできる、自動チャンネル追従装置を提供することを目的としてなされたものである。

【0010】

【課題を解決するための手段】本発明にかかる受信装置の請求項1は、自動車等の移動体に取り付けられてテレビやラジオ等の各チャンネルの放送電波を受信して復調し、出力する受信装置であって、放送電波を受信するよう構成された少なくとも2つの受信部と、何れか1つの受信部で受信している主チャンネルの信号の受信強度を検出する検出手段と、検出された信号強度が所定レベル以下か否かを判断する比較手段と、信号強度が所定レベル以下のとき、他の何れか1つの受信部を制御して、前記主チャンネルを除いた他の代用チャンネルの信号を順次受信するサーチ手段と、受信した代用チャンネルの信号と主チャンネルの信号との相関をとって一致するか否かを判断する相関手段と、受信した代用チャンネルの信号と主チャンネルの信号の相関がとれたときに、代用チャンネルを主チャンネルに切替えて出力する切替え手段とを備えるという手段を講じたものである。

【0011】請求項2は、自動車等の移動体に取り付けられてテレビやラジオ等の各チャンネルの放送電波を受信して復調する受信装置であって、放送電波を受信するよう構成された受信部と、受信している主チャンネルの信号の受信強度を検出する検出手段と、検出された信号強度が所定レベル以下か否かを判断する比較手段と、所定レベル以下のときに、各主チャンネルと、その主チャンネルの放送電波と同じ内容が放送されている代用チャンネルとを対応させた参照テーブルを参照して、受信中の主チャンネルに対応した代用チャンネルを決定して、受信部における受信チャンネルを代用チャンネルに切替える切替え手段とを備え、前記代用チャンネルを主チャンネルとして復調し、出力するよう構成したものである。

【0012】請求項3は、請求項2の受信装置に、移動体の位置情報を得る位置検出手段を付加するとともに、参照テーブルを、移動体の位置が含まれる区域毎に対応

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位置情報に基づいて地図情報記憶手段を参照して、移動体の位置が含まれる区域の地図を表示する地図表示装置とを付加するとともに、参照テーブルを、区域毎に対応した代用チャンネルが地図情報とともに地図情報記憶手段に記憶された構成としたものである。

【0014】

【発明の実施の形態】以下に、本発明にかかる受信装置を、その実施の形態を示した図面に基づいて詳細に説明する。

10 【0015】本発明の実施の形態を示した図1において、1は自動車に搭載されたテレビ受信機であり、VHF帯とUHF帯の何れかのチャンネルの信号を受信して、TV画面とスピーカとに出力するよう構成されている。R1は第1の受信部、R2は第2の受信部であり、ともに、共通のアンテナに接続されており、後述する制御部から指定されたチャンネルの信号を受信して、中間周波信号を出力するよう構成されている。

20 【0016】2はDSP（デジタル信号処理装置）を備えた制御部であり、二つの受信部R1、R2から出力される中間周波信号を復調して、何れか一方の映像信号と音声信号とを出力するとともに、図2に示したフローチャートの機能を実現する制御プログラムと制御データを備えている。P1は第1のPLL発振回路、P2は第2のPLL発振回路であり、それぞれ制御部2からのチャンネル切替え信号で指定される周波数で発振し、発振した周波数をそれぞれ第1、第2の受信部R1、R2に出力する。

30 【0017】3は制御部2へのデータを入力するキー入力部である。4は映像信号を表示するTV画面、5は音声信号を出力するスピーカである。

【0018】以下に、図2に基づいて、制御部2の復調以外の各機能とその動作を説明する。ステップ1においては、何れか一方の受信部、例えば第1の受信部R1で受信している主チャンネルの信号の受信強度を検出する。ステップ2においては、検出された信号強度が所定レベル以下の場合に、ステップ3のサーチ動作に入る。所定レベル以下でなければステップ1に戻る。

40 【0019】ステップ3においては、前記主チャンネルを除いた他のチャンネルに切替えるためのチャンネル切替え信号を、主チャンネルの信号を受信していない方の受信部、ここでは第2の受信部R2に接続された第2のPLL発振回路P2に出力する。なお、チャンネル切替え信号には、VHF/UHFの切替え信号も含んでいる。

【0020】ステップ4においては、第2の受信部R2からの受信信号の信号強度が主チャンネルの信号の受信

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ステップ5へ移行し、第2の受信部R2からの受信信号の信号強度が主チャンネルの信号の受信信号の信号強度よりも強くない場合と相関がとれなかった場合にはステップ3に戻って、次のチャンネルに切り替えるためのチャンネル切替え信号を出力する。

【0021】ステップ5においては、第2の受信部R2で受信している代用チャンネルの復調信号を、今までの第1の受信部R1からの復調信号に切替えて、TV画面とスピーカから出力する。なお、第1の受信部R1はVHF帯専用の受信部とし、第2の受信部R2はUHF帯専用の受信部とし、主チャンネルはVHF帯に、代用チャンネルはUHF帯にそれぞれ割り当ててもよい。

【0022】なお、相関をとるのは、音声信号と映像信号とを分離した後の何れか一方の信号どうしでよい。また、FMステレオ放送のパイロット信号やNTSC方式のカラー放送のサブキャリア信号が、各放送内容によって異なるように設定されるようになれば、それらの信号を抽出して相関をとってもよい。

【0023】図1に示した制御部2における中間周波信号の処理にあたっては、まず、A/D変換したのち、DSPを用いて復調し、信号強度を検出し、主チャンネルを切替え、チャンネル切替え信号を出力する等の処理を行ったが、図3に示したように、アナログ処理回路を混在させてもよいことは当然である。図3において、23は復調回路、24は相関器、25は主チャンネル切替え回路、26は信号強度検出回路、27は信号強度比較回路、28はチャンネルスキャン信号出力回路である。

【0024】また、第1の受信部R1の受信信号の信号強度と受信部R2の受信信号の信号強度とを比較して、所定の限界強度以上である限り、常に、強い信号の方を主チャンネルの信号として受信するように制御するダイバーシティ方式を応用してもよい。また、請求項2のように、受信部は1つだけとして、信号強度が低下したときには、予め代用チャンネルが設定された参照テーブルを参照して、その代用チャンネルの信号を受信するように切替えるように構成してもよい。

【0025】図4は、衛星からの電波を受信して自動車の位置（緯度・経度）を得て、その位置が含まれる区域の地図を、CD-ROMの地図情報を参照して表示する、所謂ナビゲーション装置と、カーテレビとの組み合わせに、本発明の受信装置を適用した場合の実施の形態を示すブロック図である。図4において、Tはテレビ放送の受信部、2'は制御部、PはPLL発振回路、3'はキー入力部、4はTV画面、5はスピーカである。

【0026】GはGPS受信部、7は地図情報がCD-ROM等の記憶媒体に記憶された記憶部、6は地図を表

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て、地図表示画面6に表示する。このとき、記憶部7から現在位置に対応した代用チャンネルも同時に読み出して、それに対応するチャンネル切替え信号をPLL発振回路Pに出力して受信部Tにおける受信チャンネルを、読みだした代用チャンネルに切替える。

【0028】このとき、受信部Tにおいて受信中に信号強度が低下してから代用チャンネルに切替えるようにしてもよい。

【0029】図4の形態の場合の記憶部7のデータの構成の一例を以下に説明する。図5はある地域の地図及び代用チャンネルの設定領域とを示す図であり、図5のAは縦横の破線で分けられる25の区域からなる地域の地図、図5のBは図5のAに示された地域のうち代用チャンネルが設定されている区域を斜線で示した図である。

【0030】図5のAに示したように、この地域の地区は、左上から1、2、3、・・・、25と番号が付された25枚の区域の地図データで構成されている。この地域の特徴は、中心部分（区域番号3、8、13、18、23）に大きなビルCが建ち並んでいることであり、区域番号11、12、16、17、21、22では、受信障害が発生しているために、代用チャンネル用の中継局が設置されて代用チャンネルが設定されている。図5のBに斜線及び図6に示した参照テーブルTに示したように、区域番号11、12、16、17、21、22にのみ通常の主チャンネルに対応する代用チャンネルが記憶されている。

【0031】本発明の受信装置を備えた自動車が図5の地域を移動中に、区域番号11、12、16、17、21、22の何れかに入ったことをGPS受信部Gと制御部2'と記憶部7'によって検知すると、記憶部7'からは当該区域番号の地図情報が読みだされるとともに代用チャンネルも読みだされる。よって、地図表示画面6には当該区域番号の地図を表示するとともに、受信部Tにおけるチャンネルは代用チャンネルに切替えられ、代用チャンネルの映像と音声はTV画面4とスピーカ5に出力される。

【0032】図6に示した参照テーブルTを例にとって、VHF帯の第6チャンネルの信号を受信しながら、図5の地域を区域2の方から区域22の方向へ道路Dに沿って縦に移動している場合を説明する。区域2、7を通過中は代用チャンネルが設定されていないのでチャンネルの切替えは行われぬ。このとき、これらの区域は電波障害はないのでVHF帯の第6チャンネルの信号は良好に受信できる。さらに、移動して区域12に入ったことがGPS受信部Gによって検知されると、地図表示画面6が区域12を中心とした表示に切替えられるとともに、

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受信部Tにおける受信チャンネルがUHF帯の第39チャンネルに切替えられる。

【0033】このように、自動的に代用チャンネルに切替えることにより、テレビの画像が乱れる前に良好な代用チャンネルに切替えるので、快適な受信を継続することができる。代用チャンネルが設定された区域を出た場合には、元のVHF帯の第6チャンネルに戻される。

【0034】このときは、参照テーブルTを参照してもよいが、レジスタ等に一時記憶しておいた元のチャンネルに戻ってもよい。

【0035】また、図7に示したように、2つの受信部71,72と、それぞれの受信部71,72における受信強度を比較する比較部73と、それぞれの受信部71,72における信号の相関をとる相関部74と、相関がとれたとき受信強度の強いほうの信号を出力する切替え部75とを備えた構成でもよい。

【0036】以上説明したように、この受信装置によれば、主チャンネルの信号の信号強度が低下したり、予め設定された区域に入り込んだときには、自動的に代用チャンネルに切替えるので、主チャンネルのままの状態より品質の高い状態で同一内容の放送を受信し続けることができる。よって、運転しながらチャンネル切替え操作をする必要がないので、安全な運転が可能となるのである。

【0037】なお、本発明は、カーテレビに限らず、カーラジオや種々の放送電波の受信装置に適用できる。そして、受信部は3つ以上備えていてもよい。また、参照テーブルは自動車に搭載されている記憶手段に限定されるものではなく、通過中の地域毎に電波信号等の媒体によって外部から供給されるデータを参照して代用チャンネルを決定するようにしてもよい。

【0038】また、参照テーブルは書き換え可能な記憶媒体に記憶させておき、必要に応じて更新できるようにしてもよい。位置検出手段としては、GPSだけでなく、実際の走行距離を計測しつつ位置を補正したり、地図上の道路のずれを補正したりする手法を併用してもよい。

【0039】

【発明の効果】請求項1の発明では、放送電波を受信するよう構成された少なくとも2つの受信部を備え、現在受信して復調している主チャンネルの信号の受信強度が低下したとき、自動的に、他方の受信部を用いて他のチャンネルの信号を受信し、主チャンネルの信号よりも強く受信できる同一内容の他の代用チャンネルを発見したときに、代用チャンネルに切替えるので、同一内容の放送を継続して、より高い品質で受信できるという効果が

【0041】請求項2の発明では、放送電波を受信するよう構成された1つの受信部を備え、現在受信して復調している主チャンネルの信号の受信強度が低下したとき、参照テーブルを参照して代用チャンネルを決定して代用チャンネルに切替えるので、他のチャンネルの信号を実際に受信しながらサーチしなくても、同一内容の放送を継続して受信できるという効果が得られる。

【0042】請求項3では、GPS等によって位置情報を得て、現在位置に基づいて参照テーブルを参照して、現在の位置に対応した代用チャンネルを決定して代用チャンネルに切替えることにより、他のチャンネルの信号を実際に受信しながらサーチしなくても、同一内容の放送を継続して受信できるという効果が得られる。

【0043】請求項4では、GPS等を用いたナビゲーション装置において現在位置を得て地図情報を読みだすときに、その区域の代用チャンネルも同時に読みだすので、他のチャンネルの信号を実際に受信しながらサーチしなくても、区域毎に設定された代用チャンネルの信号を受信することができる。

【図面の簡単な説明】

【図1】本発明の請求項1の受信装置の実施の形態の構成を示したブロック図である。

【図2】前記受信装置の制御部の制御フローチャートの要部である。

【図3】請求項1の受信装置の制御部の別の実施の形態を示したブロック図である。

【図4】本発明の請求項3、4の実施の形態を示したブロック図である。

【図5】或る地域の地図とその地域の代用チャンネルが設定された領域を示す図の例である。

【図6】本発明の請求項3、4における参照テーブルの一例を示した。

【図7】別の実施の形態のブロック図である。

【符号の説明】

- 1 テレビ受信機
- R1 第1の受信部
- R2 第2の受信部
- 2 制御部（検出手段、比較手段、サーチ手段、相関手段、切替え手段）
- P1 第1のPLL発振回路
- P2 第2のPLL発振回路
- T 受信部
- 2' 制御部（検出手段、比較手段、切替え手段）
- P PLL発振回路
- G GPS受信部（位置検出手段）
- 7 記憶部（地図表示情報記憶手段）

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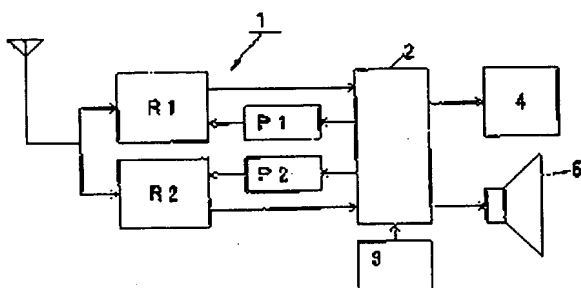
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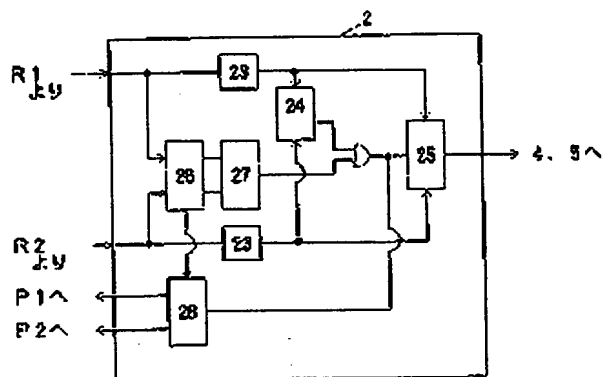
- 25 主チャンネル切替え回路 (切替え手段)
26 信号強度検出回路 (検出手段)

- * 27 信号強度比較回路 (比較手段)
* 28 チャンネルスキャン信号出力回路 (サーチ手段)

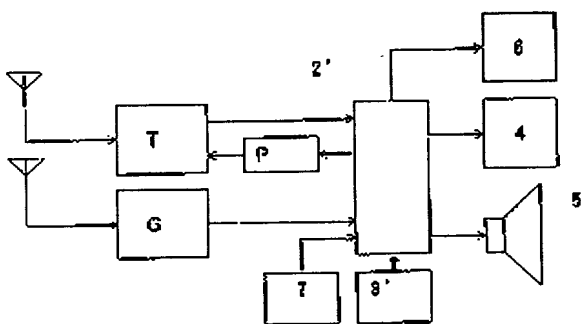
【図1】



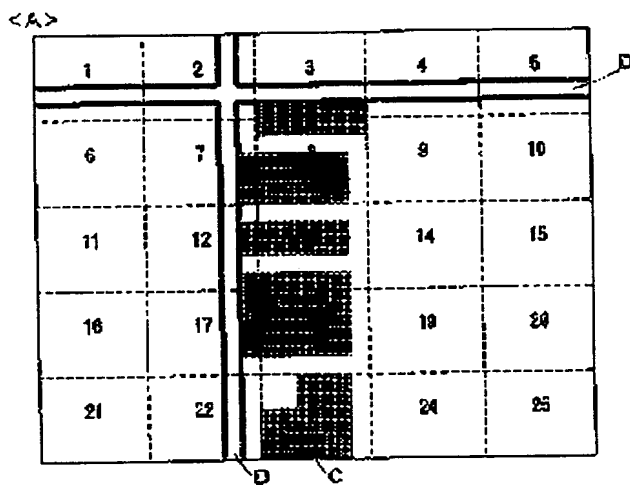
【図3】



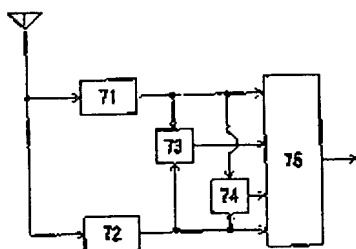
【図4】

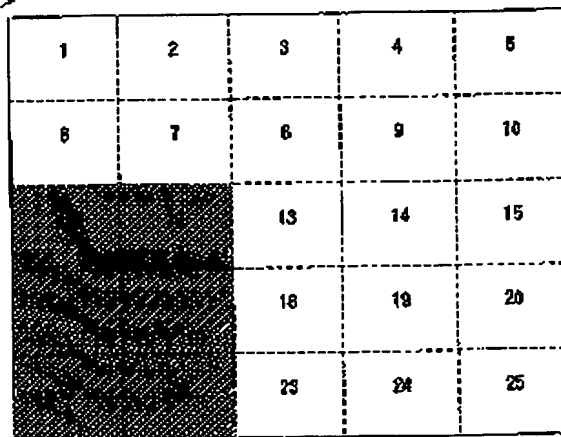


【図5】



【図7】

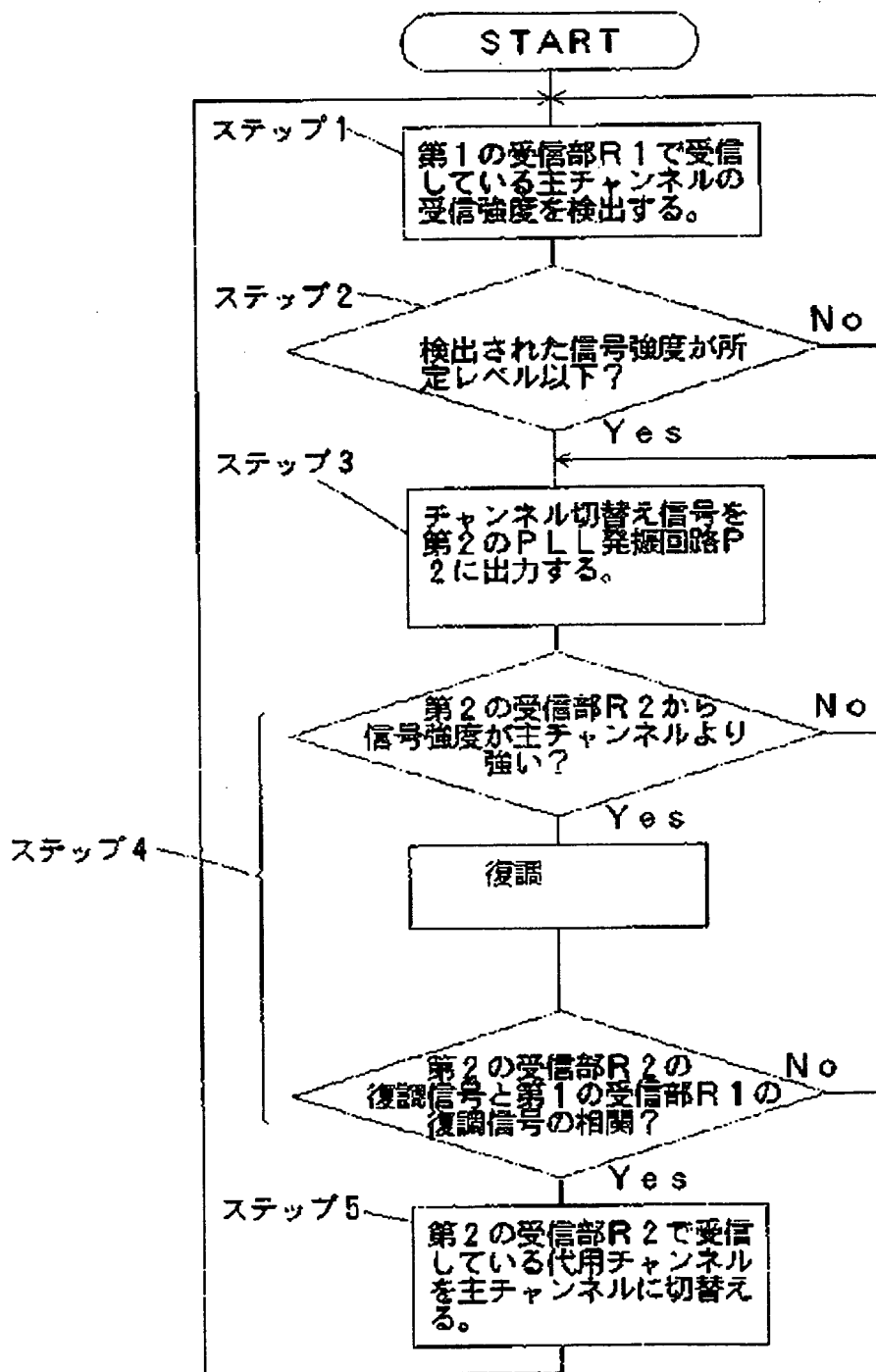




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【図2】



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【図6】

参照テーブルT		
区域番号	主チャンネル	代用チャンネル
1	2	設定なし
	4	設定なし
	6	設定なし
	8	設定なし
	10	設定なし
	12	設定なし
21	2	35
	4	37
	6	39
	8	41
	10	43
	12	45
22	2	35
	4	37
	6	39
	8	41
	10	43
	12	45
25	2	設定なし
	4	設定なし
	6	設定なし
	8	設定なし
	10	設定なし
	12	設定なし

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